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Small Firms in the Big BIM World

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Learning Objectives

- Discover the importance information plays in the BIM Process
- Discover the time and money involved in migrating to Revit
- Learn how to work in the larger collaborative world, not just in “my drawings”
- Learn how to provide larger firms with the high-quality models they need, while still being profitable

Description

We've heard all about the successes that companies have had jumping into Building Information Modeling (BIM) using Revit software. But more often than not, these experiences come from the big players—large companies with hundreds of employees and multiple offices worldwide. But what about the little guy? Firms of 15 to 20 people, or even less. Can Revit software benefit them? We will dive into the special challenges that are faced by smaller firms wanting to take the leap to Revit software, and we’ll look at how living in the BIM world can help them to not just play, but also thrive, alongside the larger companies.

Your AU Experts

Jerry Marselle has been with SMBH, Inc., since 1997. He started at SMBH while still in high school, and over the years he has held multiple responsibilities such as a drafter and CAD manager. Jerry’s is currently the Director of Technology. He has unique expertise in Revit software BIM model creation and management, development and implementation of BIM standards and processes, and the creation and maintenance of custom/reusable Revit software content. His leadership role also includes training, supervision, and technical support for SMBH’s Revit operations, as well as being responsible for all technology aspects of the firm. Jerry has spent much time developing cross-firm collaboration with Revit software and working with clients to refine the process. He has participated in and led several roundtable discussions as well as developed American Institute of Architects (AIA)-registered presentations on Revit software and BIM that have been presented to multiple architectural firms, professional organizations, and owners.

Information and the BIM Process

Understanding BIM

BIM is not a recent buzzword. The concept of 'BIM' has been around since 1962! However, it is only in the past 10 years that BIM has truly found its way into our industry and is completely revolutionizing everything that we do. We can't simply jump into something this life-changing without understanding what it means!

Why do we need BIM?

"A study was commissioned to identify and estimate the efficiency losses in the U.S. capital facilities industry resulting from inadequate interoperability. The study included design, engineering, facilities management and business processes software systems and redundant paper records management across all facility life-cycle phases. Based on interviews and survey responses, $15.8 billion in annual interoperability costs were quantified for the capital facilities industry in 2002. Of these costs, two-thirds are borne by owners and operators, which incur most of these costs during ongoing facility operation and maintenance."

This is just one case study. There are many more out there like this. In short, the industry is looking for ways to close this gap. We are all trying to find ways to produce a better product (drawings) for less money and at a higher profit.

What is BIM?

Building information modeling (BIM) is a process involving the generation and management of digital representations of physical and functional characteristics of places. Building information models (BIMs) are files (often but not always in proprietary formats and containing proprietary data) which can be exchanged or networked to support decision-making about a place.
Source: Wikipedia

What is Revit

Autodesk Revit is building information modeling software for architects, structural engineers, MEP engineers, designers and contractors. It allows users to design a building and structure and its components in 3D, annotate the model with 2D drafting elements, and access building information from the building model's database. Revit is 4D BIM capable with tools to plan and track various stages in the building's lifecycle, from concept to construction and later demolition.
Source: Wikipedia

What Does This Mean?

BIM IS A PROCESS! It is about how we gather information, how we use that information, how we convey that information to each other, and how we work together as a team.

AUTODESK REVIT IS A BIM TOOL! It is a piece of software that we use to leverage that process. And just like any tool, it can be used incorrectly.

What is the BIM Process?

Unfortunately, there is no single definition. People will see it in different ways. Some suggest its model centric: that it is all about everyone on the design team having access to models. That is of course is a huge part of it. But not all models are created equal. And to drive the creation of a high quality model to be used in the BIM process, you need people. Everyone that works on a project from the building owner down to the intern that cleaned up some text is the back bone of the process. BIM wants us to be more collaborative than we have ever been with our teams.

Keep the lines of communication open!

What is the Most Important Piece?

The 'M' in the acronym BIM is not the most important piece. The 'I' is what really makes the BIM Process hum. Incorporating the correct information into the model, at the right time, makes for the quality of model that we want to have to be a valuable member of the design team. But we can't rely on "it's in the model". We need to openly share ideas and important information.

Changes Workflow

The "Paradigm Shift" is the basic concept of how BIM and Autodesk Revit are changing the overall workflow of a project:

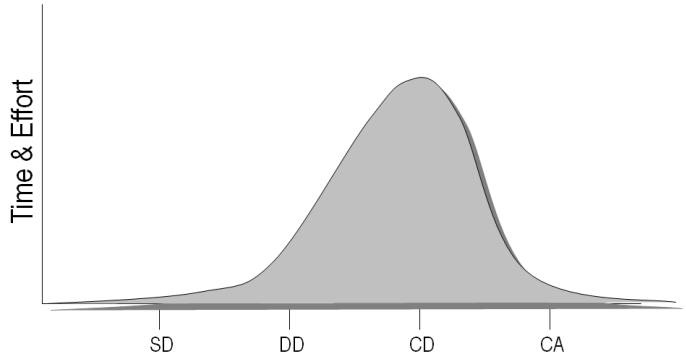

FIGURE 1: WORKFLOW CURVE ON A TRADITIONAL PROJECT

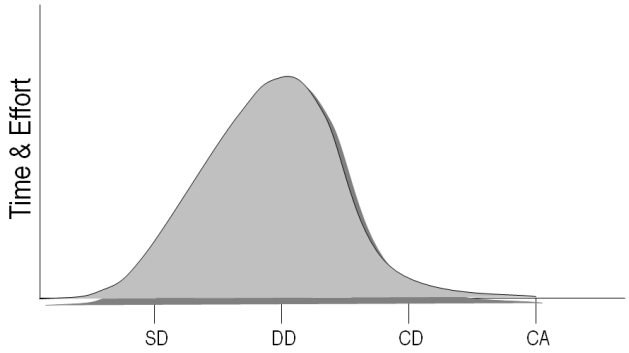

FIGURE 2: WORKFLOW CURVE ON A BIM PROJECT

The ability to have live 3D information allows us to get better coordinated designs earlier in the project, creating less work in the CD and CA phases of a project.

Has it Been Successful?
Yes. And the Autodesk Case Studies Website is full of success stories! Firms that are 50, 60, 100+ people strong, working on $500million Projects…..How about something more realistic for the vast majority of us?

SMBH Project Study:
Ohio School for the Deaf/Ohio State School for the Blind Project
Original Project: 2 Academic Buildings over 150,000sq/ft. each
Entire project completed in Revit over the course of a year, resulted in small profit.
Total Construction Cost ran over budget-

Redesign!
One building completely redesigned, second half redesigned
Schedule compressed to 6 weeks
Only given 25% of our original fee
Profit = 49%

The redesign was successful because we changed up our PROCESS. Up to this point, our process hadn't changed much from AutoCAD. But with the redesign, we changed how we handled information flow, duties in the office, communication paths, and how we used software and technology to be more in line with the process that lets BIM and Autodesk Revit work their best.

(Sorry, but) Revit Costs Money

More than Just the Software

There's no way around it, Autodesk Revit is expensive! But that is not the only hard cost you will have to take on to be successful. The big boys have huge revenues with huge R&D budgets. That's not always a reality for the small firms. Knowing and planning for all the costs associated with the "BIG BIM SWITCH" will help avoid some nasty surprises down the road.

Computer Upgrades

System requirements for AutoCAD 2016	
Operating System	• Microsoft® Windows® 10 (requires AutoCAD 2016 SP1) • Microsoft Windows 8/8.1 • Microsoft Windows 7
CPU Type	Minimum Intel® Pentium® 4 or AMD Athlon™ 64 processor
Memory	**For 32-bit AutoCAD 2016:** • 2 GB (3 GB recommended) **For 64-bit AutoCAD 2016:** • 4 GB (8 GB recommended)
Display Resolution	1024x768 (1600x1050 or higher recommended) with True Color
Display Card	Windows display adapter capable of 1024x768 with True Color capabilities. DirectX® 9 or DirectX 11 compliant card recommended.
Disk Space	Installation 6.0 GB
Pointing Device	MS-Mouse compliant device
Media (DVD)	Download and installation from DVD
Browser	Windows Internet Explorer® 9.0 (or later)
.NET Framework	.NET Framework Version 4.5
Network	Deployment via Deployment Wizard. The license server and all workstations that will run applications dependent on network licensing must run TCP/IP protocol. Either Microsoft® or Novell TCP/IP protocol stacks are acceptable. Primary login on workstations may be Netware or Windows. In addition to operating systems supported for the application, the license server will run on the Windows Server® 2012, Windows Server 2012 R2, Windows Server 2008, Windows 2008 R2 Server editions. Citrix® XenApp™ 6.5 FP1, Citrix® XenDesktop™ 5.6.

FIGURE 3: AUTODESK REVIT PERFORMANCE SYSTEM SPEC

Performance: Large, complex models	
Operating System [1]	**Microsoft® Windows® 7 SP1 64-bit:** Windows 7 Enterprise, Ultimate, Professional, or Home Premium **Microsoft® Windows® 8 64-bit:** Windows 8 Enterprise, Pro, or Windows 8 **Microsoft® Windows® 8.1 64-bit:** Windows 8.1 Enterprise, Pro, or Windows 8.1
CPU Type	Multi-Core Intel® Xeon®, or i-Series processor or AMD® equivalent with SSE2 technology. Highest affordable CPU speed rating recommended. Autodesk® Revit® software products will use multiple cores for many tasks, using up to 16 cores for near-photorealistic rendering operations.
Memory	16 GB RAM • Usually sufficient for a typical editing session for a single model up to approximately 700 MB on disk. This estimate is based on internal testing and customer reports. Individual models will vary in their use of computer resources and performance characteristics. • Models created in previous versions of Revit software products may require more available memory for the one-time upgrade process.
Video Display	1,920 x 1,200 with true color DPI Display Setting: 150% or less
Video Adapter	DirectX® 11 capable graphics card with Shader Model 3 as recommended by Autodesk.
Disk Space	5 GB free disk space 10,000+ RPM (for Point Cloud interactions) or Solid State Drive
Media	Download or installation from DVD9 or USB key
Pointing Device	MS-Mouse or 3Dconnexion® compliant device
Browser	Microsoft® Internet Explorer® 7.0 (or later)
Connectivity	Internet connection for license registration and prerequisite component download

FIGURE 4: AUTODESK REVIT PERFORMANCE SYSTEM SPEC

Price of ACAD Machine=$1500ish
Price of Autodesk Revit Machine=$2000ish (desktop); $3000ish (laptop)

Network Upgrades
1 gb/sec is the absolute MINIMUM for speed. 10gb/s, 40gb/s, 100gb/s….all will very much be a reality

Storage Space: YOU NEED LOTS!!!!
File Size Comparison:
Avg. 50,000sq/ft. office building
Size of all AutoCAD Files: 10MB
Structural Revit Model: 50MB
Arch models: 300MB

Models keep getting larger! New features are added to Revit with every release and users are getting more advanced in what they put into the models and in the way they use them.

Misc Technology
Cloud computing and collaboration technologies are the next leap for our industry. The ability to access our information wherever we are and to stay connected at all times and share whatever we need to is invaluable. This used to be the realm of just the mega firms. In general, the cost of technology is coming down, and its accessibility is going up. Taking advantage of any technology that helps us communicate better and work more efficiently is a must in todays market.

AUTODESK® 360

Training
While process is very crucial, we cannot forget about the technical aspect of BIM and Autodesk Revit. We need to know what we're doing, and know our software in and out, backwards and forwards.

Training Options

- An Autodesk Reseller that offers training programs, both in and out of house (recommend)
- Books - there's lots out there
- Videos - There are different training courses you can get on video, or download from the web, which are a step by step teaching you the Revit Fundamentals
- MOOCS, Lynda.com, Youtube.com - You can learn a lot from web videos
- Mentor – you need someone that you can ask questions to and who can help vet ideas. Someone experienced, that you can trust. (More than one!)

Never Stop!
Never think you've learned it all! I am still learning, every day. The software and technology changes continually and we must stay on top of it all.

Time Investment

- Setting up new standards
- Define workflows
- Create reusable content
- Create new templates

TIP: Use your early Autodesk Revit projects for these types of things. As you create a detail component, symbol, or typical detail, save it to your network to be used again in the future. Use your first project as a basis for your template and revise as you go. Experiment with workflows within your office and find what works best for you.

You need a CHAMPION!
Another buzzword, but one that is necessary. It's easy for a firm of 100 people to create a committee of 5 or 6 people who 100% buy in to BIM that can work together to iron out all the wrinkles before a wide rollout. That's not as easy for a firm of 20. So it is important to have a Revit Champion: a person whose sole purpose is to understand BIM, master Revit, and is excited for what it can bring to your firm and can make others excited as well.

The Champion will wear a lot of hats. They'll be tech support, advisor, problem solver, marketer, liaison, and bridge builder….in addition to one who will work directly on projects. The other firms we work with will look at the champion as being representative of the ability of the entire firm to work in a BIM environment. So they also will need to be highly confident in their abilities and comfortable with everything they need to do.

Working in the Larger World

One Word: RELATIONSHIPS!
One of the biggest foundations for building and maintaining a successful business is the relationships that we make. Relationships are very important to the BIM Process as well. In order to work effectively with larger firms, we have to put ourselves out there. Sometimes smaller firms tend to like to stay in the background, not rocking the boat. We've talked about BIM being a "people process", and we need to be sure that we are part of that process.

Outside of Office
Getting out of the office is more than just simply attending required meetings and sending the occasional email or making the occasional phone call. We need to be an ACTIVE part of the process! If we are not, we'll be perceived as 'not a team player' or someone who 'doesn't get it'. We want to stay flexible, willing to hear the opinions of everyone on the design team, but at the same time not afraid to make our opinion known on what will work the best.

The BIM Champion should be an integral part of this. Building relationships with their counterpart at other firms is crucial. A good relationship will allow them to develop the BIM Process that will be used on the projects the firms will be doing together. And keeping that relationship going will allow the process to continually be refined.

Inside of Office
Making the switch to BIM and Autodesk Revit will likely change the workflow, not just from a design team perspective, but how we work together internally as well. No matter how collaborative your office culture and environment is, the switch will force you to go to the next level. Building relationships with your co-workers and striving to be sure we're all going the same direction will help facilitate whatever changes will come.

Share What You Know
Over the past decade, Autodesk Revit and BIM have created a large community of people sharing what they know. Online discussion forums, people taking their time to make YouTube videos, local user groups: all are great ways to network with people and have a great exchange of information.

"The Roundtable"
This is the name we gave to a series of meetings that my firm initiated to improve our relationship, process, and workflow between other firms that we work with.

- Partnered with an Architect and an MEP firm
- Monthly, 2-3 hour meeting, where we could discuss all things BIM and Autodesk Revit
- Discussed issues facing our firms in general
- At times the meeting was technical in nature, sometimes business oriented, sometimes just "philosophical"
- Didn't worry about sharing any trade secrets or someone gaining some kind of 'edge'
- Our interest was only to help us work better with each other

Give the People What They Want!

Quality Work

Even the best relationship will not survive bad work! We need to be sure what we produce is of high quality.

Accuracy

This is of utmost importance! The temptation to fall back on the old "close enough" is strong. But inaccurate models are of no use to anyone. True, our deliverable is still our drawings, and we don't always have to model accurately to create a drawing that "looks right". But reducing Autodesk Revit to simply a drawing tool is counterproductive. The other people on the design team will not be able to use the model in any meaningful way, costing them time and money. Also, it will prevent us from reaping all of the benefits that the tools in Autodesk Revit provide.

Another reason accuracy is important is the future. We may not be fully there yet, but the day is coming where the model is our sole deliverable. When that day comes we need to be ready and able to do this. It's a good idea to think in those terms (where it's practical) now, so we don't develop bad habits that we'll just need to unlearn later.

Model What is Needed (and not just by us)

Accuracy does not mean we have to model EVERYTHING! But we need to model enough. What enough means can vary project by project. We do have the LOD Standards to use as a guide. But even that can mean different things to different projects. It's important to discuss these between the design team EARLY! Clearly defined expectations will prevent a lot of heartaches down the road.

We have to be sure we keep an open mind. There may be instances where we don't need to model something for our purposes, but it would help the design of our partners on the project if we included this. It may take us some extra time to do this, but by providing this information in the model, the overall design in the project becomes better, reducing the likelihood of conflicts arising at the end.

Coordinate Often

Sharing our model often is important to a successful BIM project. The frequency of sharing should be determined early in the project and agreed upon by the entire design team.

Coordination should not simply involve a model share. Communication is a vital part of our coordination. Letting each other know what was changed, what we're doing, and what our goals our going forward will make the coordination process much smoother. Without good communication, we're basically flying blind, which completely breaks down the BIM Process.

Define Standards

Just as it was in AutoCAD, having standards is still an important part of the BIM workflow. Having a consistent output, in both our model and our drawings, shows that we have a commitment to quality, and allows us to do so in an efficient manner.

Legacy Standards vs. "The New Way"

Revit gives you a fair amount of flexibility in making the drawings look a certain way. Most firms will want to try to make the drawings look exactly like they do from AutoCAD. But as you begin to develop those standards, you will run into conflicts. In some cases, Autodesk Revit is set up out of the box to show items in a particular way, and changing that to something different may involve a lot of work, or may cause you to lose some of the functionality Autodesk Revit provides. The final decision on which way to go needs to be based on what's most important: is it the look or the functionality?